

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE



In re Application of: :  
Jeffrey A. Lee : Examiner: Jose A. Fortuna  
U.S. Serial No. 10/625,086 : Group Art Unit: 1731  
Filed July 23, 2003 :  
Docket No. 2159-A (FJ-99-39A) :  
For: METHOD OF BLEACHING AND :  
PROVIDING :  
PAPERMAKING FIBERS WITH :  
DURABLE CURL :  
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Mail Stop Amendment  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, Virginia 22313-1450

DECLARATION OF JEFFREY A. LEE UNDER 37 CFR §1.131

Jeffrey A. Lee, inventor of the subject matter of the above-noted patent application hereby declares that:

1. He was awarded a Bachelor of Science degree from the University of Wisconsin in Green Bay, Wisconsin and has worked in the field of paper manufacture since 1989. That he believes himself the sole inventor of the subject matter of the above-noted patent application, which is generally directed to an absorbent cellulosic sheet made from curled and uncurled fiber from the same source.
2. That he has been advised by Counsel that the claims of the above-noted patent application have been rejected over United States Patent No. 6,413,362 of Hu which has an effective date as prior art of November 24, 1999.

3. That well before November 24, 1999, and under his supervision, the invention of the above-noted patent application was made on a papermachine at the Research Center where he is employed in Neenah, Wisconsin. Specifically, curled and uncurled fiber from the same source were mixed in a headbox and made into absorbent sheet. The curled fiber component used was concurrently bleached, heat-treated and curled as is described in the above-noted patent application.
4. Attached to this Declaration are (redacted) pages 24 and 25 of a Research Report dated prior to November, 1999 confirming manufacture of the absorbent sheet as recited in paragraph 3 above. The first full paragraph on page 24 of the report closely tracks the last paragraph on page 38 of the application as filed and Table 7 of the report has the data appearing in Table 9 of the patent application as originally filed, page 39 thereof. Further, Figure 2 of the patent application is a version of Figure 29 of the Research Report, appearing on the attached page 25.
5. The undersigned Declarant declares further that all statements made herein of his own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the subject application or any patent issuing thereon.

1/16/05  
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Date

  
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Jeffrey A. Lee

just for the drying energy or speed benefit. This process may result in a similar benefit with only a fraction of the operating and capital costs associated with pulp dryers. Future experiments will be conducted on slush pulps to further understand this opportunity.

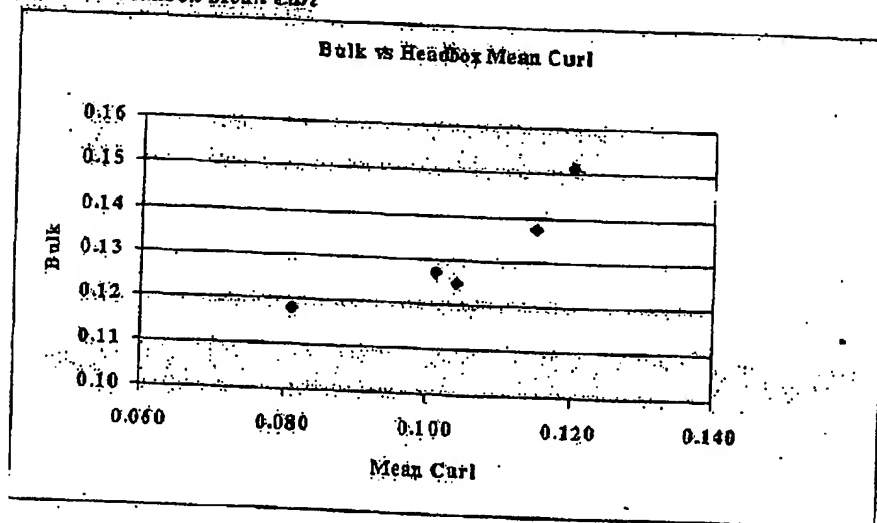
### NTC Paper Machine #1 Trial

In a pilot paper machine #1 trial was performed utilizing curled fiber from the batch renner. A sample of Grade 635 paper was used as the control and curled pulp. The paper was wetted to 35% consistency and run through the lab pilot pulp breaker before use in the refiner. Utilizing the bleaching/curling process (Case 2159) five batches of pulp were produced on October 26<sup>th</sup> and 27<sup>th</sup> and the trial run October 28<sup>th</sup>. The five batches of pulp were combined in the machine chest, diluted to about 2% consistency and continuously agitated for the trial duration. The curl at the machine chest and headbox was monitored for each cell. In Figure 15 (above) the curl is plotted versus time in the machine chest demonstrating the resilience of the curl produced. For the trial a nominal 9 lb/3000ft<sup>2</sup> dry crepe sheet was produced. In Table 7 the basesheet results are given. The mean curl versus the sheet bulk is plotted in Figure 29. As the percentage of curled fiber is increased the headbox curl increased and so did the bulk. A similar relationship is seen in Figure 30 where the tensile results are plotted versus the curl; the tensile dropped with increasing curl. In Figure 31 the porofil number (void volume) and headbox curl are plotted with the percent curled fiber in the furnish. This plot shows that both the curl in the headbox and the increasing porofil are a function of the percentage curled fiber in the furnish; the curl is resilient (survives mechanical action of agitation and pumping) and drives the changes in the sheet structure.

Table 7  
Base Sheet Results  
PM #1

	Cell Number	4538-1	4538-4	4538-3	4538-5	4538-2
% Refiner Bleached Fiber		0	20	40	60	100
Basis Weight	lb/3000 ft <sup>2</sup>	8.9	8.5	8.5	8.3	7.2
Caliper	In	33.7	34.0	34.6	36.5	34.9
Bulk	ft <sup>3</sup> /lb	0.118	0.125	0.127	0.137	0.151
MD Tensile						
Max Load	g	679.737	529.313	462.691	470.589	308.430
% Disp	%	25.667	24.426	23.296	25.759	24.667
TEA	g/mm	0.822	0.695	0.653	0.672	0.473
CD Tensile						
Max Load	g	424.431	340.157	308.716	274.995	230.614
% Disp	%	4.500	5.296	4.981	6.037	6.370
TEA	g/mm	0.144	0.128	0.117	0.126	0.115
Headbox Mean Curl		0.081	0.104	0.101	0.115	0.120
Porofil		8.3	8.6	8.4	9.4	10.3

**Figure 29**  
**Bulk and Headbox Mean Curl**



**Figure 30**  
**Tensile and Headbox Mean Curl**

